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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Maier, et al.
Serial No.	:	10/565,328
Filed	:	January 20, 2006
For	:	SELF-CROSSLINKING HIGH-MOLECULAR POLYURETHANE DISPERSION
Art Unit	:	1796
Examiner	:	P. D. Niland

January 23, 2009

This correspondence is being filed electronically addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Eileen Sheffield Date: 1/23/09

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT UNDER RULE 111

Sir:

Responsive to the action mailed October 28, 2008, please amend the above-identified patent application as follows:

IN THE CLAIMS

1-25 (canceled)

26. (currently amended) A self-crosslinking polyurethane dispersion based on oxidatively drying at least one of a diol or triol, wherein reaction components consist of:

(A) from > 12 to 30% by weight of an unsaturated fatty acid component which is capable of oxidative drying and consists of ~~comprises~~ at least one reaction product of unsaturated fatty acids and aliphatic epoxy resins, aromatic epoxy resins or polyepoxides having two or three epoxide groups reactive to a fatty acid or fatty acid epoxy ester having two or three reactive hydroxyl groups,

(B) from 2 to 11% by weight of a polyol component consisting of

(i) from 0 to 1.5% by weight of at least one low molecular weight polyol having two or more reactive hydroxyl groups and a molecular mass of from 60 to 150 dalton,

(ii) from 0.8 to 6% by weight of at least one higher molecular weight polyol having two or more reactive hydroxyl groups and a molecular mass of from 500 to 4000 dalton,

(iii) from 1.2 to 3.5% by weight of at least one anionically modified polyol having two or more reactive hydroxyl groups and one or more carboxyl groups which are inert toward polyisocyanates;

(C) from 8 to 25% by weight of a polyisocyanate component consisting of at least one polyisocyanate or a derivative of a polyisocyanate based on bis(4-isocyanato-cyclohexyl)methane (H_{12}MDI), 1,6-diisocyanatotohexane (HDI) or 1-isocyanato-5-isocyanatomethyl-3,3,5-trimethylcyclohexane (IPDI) which contain an allophanate, a biuret, a

carbodiimide, an isocyanurate, an uretdione or an urethane group, a polyisocyanate derivative based on 1,6-diisocyanatohexane (HDI) which has been hydrophilically modified or a higher homolog of aromatic polyisocyanate 2,4-diisocyanatotoluene, toluene diisocyanate (TDI) or bis(4-isocyanatophenyl)methane (MDI) having two or more aliphatic or aromatic isocyanate groups,

(D) from 0 to 10% by weight of a solvent component consisting of at least one solvent which is inert toward polyisocyanates and is completely or partially miscible with water;

(E) from 0.5 to 3% by weight of a neutralization component consisting of at least one base based on an amine or hydroxide;

(F) from 0 to 0.5% by weight of a siccative component consisting of at least one water-emulsifiable active or auxiliary dryer;

(G) from 0.5 to 3% by weight of a chain extension component consisting of at least one polyamine having two or more reactive amino groups;

and water as the balance.

27. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (A) has an iodine number in the range from 100 to 150 g $I_2 \cdot (100g)^{-1}$, a hydroxyl number of from 120 to 150 mg $KOH \cdot g^{-1}$ and an acid number of from 1 to 5 mg $KOH \cdot g^{-1}$.

28. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (A) has a viscosity of from 2500 to 25,000 mPa·s (20°C).

29. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (A) consists of a reaction product of an unsaturated fatty acid and

aliphatic or aromatic epoxy resin or polyepoxide having two or three epoxide groups which are reactive toward fatty acid.

30. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (A) consists of a reaction product of at most a triple unsaturated fatty acid having an iodine number of from 170 to 190 g $I_2 \cdot (100g)^{-1}$ and an aliphatic or aromatic epoxy resin or polyepoxide having an epoxide number of >0.5 $eq \cdot (100g)^{-1}$.

31. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (B) (i) consists of at least one low molecular weight polyol having a molecular mass of from 90 to 140 dalton.

32. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (B) (ii) consists of a polymeric polyol selected from the group consisting of a polyalkylene glycol, an aliphatic polyol, an aromatic polyester polyol, a polycaprolactone polyol a polycarbonate polyol and a combination thereof.

33. (previously presented)The polyurethane dispersion as claimed in claim 32, wherein said component (B) (ii) consists of a linear polypropylene glycol or a bifunctional polypropylene glycol.

34. (previously presented)The polyurethane dispersion as claimed in claim 26 wherein said component (B) (ii) consists of at least one higher molecular weight polyol having a molecular mass of from 1,000 to 2,000 daltons.

35. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (B) (iii) consists of at least one bishydroxyalkanecarboxylic acid.

36. (previously presented)The polyurethane dispersion as claimed in claim 35, wherein said bishydroxyalkanecarboxylic acid is dimethylolpropionic acid.

37. (canceled)

38. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said neutralization component (E) comprises at least one of ammonia or a tertiary amines.

39. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said neutralization component (E) consists of an alkali metal hydroxide.

40. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said neutralization component (E) is present in such an amount that the degree of neutralization based on the free carboxyl groups is from 80 to 100 equivalent-%.

41. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said siccative component (E) consists of at least one of a metal soap or a metal salt.

42. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said chain extension component (G) is present in such an amount that the degree of chain extension is from 50 to 100 equivalent-%, based on the free isocyanate groups of the prepolymer.

43. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (A) is present in an amount of from $\geq$ 13 to 30% by weight; said component (B) (i) is present in an amount of from 0.4 to 1% by weight, said component (B) (ii) is present in an amount of from 1.6 to 5% by weight; said component (B) (iii) is present in an amount of from 1.6 to 3% by weight; said component (C) is present in an amount of from 12 to 20% by weight; said component (D) is present in an amount of from 7 to 9% by weight; said component (E) is present in an amount of from 1 to 2% by weight; said component (F) is present

in an amount of from 0.1 to 0.5% by weight; said component (G) is present in an amount of from 1 to 2% by weight; and the balance is water.

44. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein a NCO/OH equivalent ratio of the components (A), (B) and (C) is in the range from 1.2 to 2.0.

45. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein a solids content is from 30 to 60% by weight.

46. (canceled)

47. (previously presented)A process for preparing the polyurethane dispersion as claimed in claim 26 comprising

a) reacting said components (A) to (C), optionally in said solvent component (D), and optionally in the presence of a catalyst, to form a polyurethane prepolymer;

b) subsequently reacting the prepolymer from stage a) with said neutralization component (E) and, optionally, with the siccative component (F); and

c) subsequently dispersing the prepolymer from stage b) in water reacting it with the chain extension component (G) to form the polyurethane dispersion.

48. (previously presented)The process as claimed in claim 47, wherein reaction stage a) is carried out at from 60°C to 120°C.

49. (previously presented)The process as claimed in claim 47, wherein reaction stage (a) is carried out in the presence of from 0.01 to 1% by weight, based on the components (A) to (D), of a catalyst suitable for polyaddition reactions on a polyisocyanate.

50. (previously presented)A one-component paint, varnish, coating for the surfaces of a mineral building material selected from the group consisting of concrete, wood, a

wood material, a paper, metal a plastic a one-component adhesive or a sealant in the building sector comprising a binder comprising the polyurethane dispersion of claim 26.

51. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein said component (B)(iii) consists of at least one anionically modified polyol having a molecular mass of from 100 to 200 daltons.

52. (currently amended) A self-crosslinking polyurethane dispersion based on oxidatively drying at least one of a diol or triol, wherein reaction components consist of

(A) from $\geq$ 14% to 30% by weight of an unsaturated fatty acid component which is capable of oxidative drying and consists of at least one reaction product of unsaturated fatty acids and aliphatic epoxy resins, aromatic epoxy resins or polyepoxides having two or three epoxide groups reactive to a fatty acid or fatty acid epoxy ester having two or three reactive hydroxyl groups,

(B) from 2 to 11% by weight of a polyol component consists of

(i) from 0 to 1.5% by weight of at least one low molecular weight polyol having two or more reactive hydroxyl groups and a molecular mass of from 60 to 150 dalton,

(ii) from 0.8 to 6% by weight of at least one higher molecular weight polyol having two or more reactive hydroxyl groups and a molecular mass of from 500 to 4000 dalton,

(iii) from 1.2 to 3.5% by weight of at least one anionically modified polyol having two or more reactive hydroxyl groups and one or more carboxyl groups which are inert toward polyisocyanates;

(C) from 8 to 25% by weight of a polyisocyanate component consisting of at least one polyisocyanate or a derivative of a polyisocyanate based on bis(4-isocyanato-cyclohexyl)methane (H_{12}MDI), 1,6-diisocyanatotohexane (HDI) or 1-isocyanato-5-isocyanatomethyl-3,3,5-trimethylcyclohexane (IPDI) which contain an allophanate, a biuret, a carbodiimide, an isocyanurate, an uretdione or an urethane group, a polyisocyanate derivative based on 1,6-diisocyanatohexane (HDI) which has been hydrophilically modified or a higher homolog of aromatic polyisocyanate 2,4-diisocyanatotoluene, toluene diisocyanate (TDI) or bis(4-isocyanatophenyl)methane (MDI) having two or more aliphatic or aromatic isocyanate groups,

(D) from 0 to 10% by weight of a solvent component consisting of at least one solvent which is inert toward polyisocyanates and is completely or partially miscible with water;

(E) from 0.5 to 3% by weight of a neutralization component consisting of at least one base based on an amine or hydroxide;

(F) from 0 to 0.5% by weight of a siccative component consisting of at least one water-emulsifiable active or auxiliary dryer;

(G) from 0.5 to 3% by weight of a chain extension component consisting of at least one polyamine having two or more reactive amino groups;

and water as the balance.

53. (previously presented)The polyurethane dispersion as claimed in claim 26, wherein the component A is present in an amount of $\geq$ 14% by weight.

54. (new) A process for preparing the polyurethane dispersion as claimed in claim 26 consisting of

a) reacting said components (A) to (C), optionally in said solvent component (D), and optionally in the presence of a catalyst, to form a polyurethane prepolymer;

b) subsequently reacting the prepolymer from stage a) with said neutralization component (E) and, optionally, with the siccative component (F); and

c) subsequently dispersing the prepolymer from stage b) in water reacting it with the chain extension component (G) to form the polyurethane dispersion.

55. (new) The process as claimed in claim 54, wherein reaction stage a) is carried out at from 60°C to 120°C.

56. (new) The process as claimed in claim 54, wherein reaction stage (a) is carried out in the presence of from 0.01 to 1% by weight, based on the components (A) to (D), of a catalyst suitable for polyaddition reactions on a polyisocyanate.

REMARKS

Entry of this amendment is respectfully requested.

Claims 26-36, 38-45, 47-51 and 53 were rejected under 35 U.S.C. §112, second paragraph, because the term "comprising" allegedly renders the claims, which also recite "consisting of", unclear. Claim 26 has been amended accordingly. It is not believed this rejection applies to any of the process claims, because "comprising" in these claims refers to the process steps, and not to be composition. In view of the foregoing, withdrawal of this rejection is respectfully requested.

Claims 26-36, 38-45 and 47-53 were rejected under 35 U.S.C. §102(b) for allegedly being anticipated by Ingrisch. Claims 26-36, 38-45 and 47-53 were rejected under 35 U.S.C. §103(b) for allegedly being unpatentable over Ingrisch. Applicants respectfully traverse each of these rejections.

At Item 6 of the Office Action the Examiner alleges that claims 26 and 52 were anticipated or made obvious vis-a-vis Ingrisch even if components H and I are excluded from the polyurethane according to the present invention due to the "consisting of" language.

The Examiner refers to column 11, lines 30-48, describing the process without the process steps bl and b2 in which monomer H is added and polymerized by the initiator component I.

According to the Examiner, the intermediate product consisting of components A-G is isolated and sufficiently stable over a certain time period, such that the dispersion formulation according to the present invention anticipated by Ingrisch.

An essential difference between the present claimed invention and Ingrisch is the amount of component A used for the polyurethane resins. Ingrisch discloses the use of 3 to 12 weight percent of component A based on the total weight of the components A-I and water

(Ingrisch, column 5, lines 19-21), whereas according to the invention a $\geq$ 13 or a $\geq$ 14 weight percent of component A is present in the dispersion.

According to the invention the weight percent values are based on the total amount of components A-G and water (cf. page 14, last paragraph).

The Examiner argues that if the component A is used in amounts of approximately 12 weight percent based on components A-I (calculation according to US 6,462,127), a value for component A based on components AG (calculation according to the invention) is obtained which is greater than 12 weight percent, and, therefore, the ranges of the application and of Ingrisch overlap.

The Examiner's argument in this respect (see Office Action, page 3, lines 12-18) is believed to be overcome by the term "consisting of" which excludes any other components. Thus, the present invention is not anticipated by Ingrisch.

With regard to the §103 rejection, the presently claimed composition has, among other things improved properties (See page 19, lines 5-12), especially chemical resistance (See page 19, line 11 and page 29, first paragraph after the Tables). Thus, this rejection should be withdrawn.

In view of the foregoing, allowance is respectfully requested.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-0624, under Order No. NY-HUBR-1291-US. A duplicate copy of this paper is enclosed.

Respectfully submitted

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